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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,645	12/05/2005	Masami Miura	2005-0447A	1480

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EXAMINER	
JANAKIRAMAN, NITHYA	

ART UNIT	PAPER NUMBER
2123	

MAIL DATE	DELIVERY MODE
09/25/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,645	MIURA ET AL.	
	Examiner	Art Unit	
	NITHYA JANAKIRAMAN	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,9 and 10* is/are rejected.

7)☒ Claim(s) *2-4, 6-8 and 11-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/31/2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/20/09 has been entered.

Response to Arguments- Objections

1. Applicant's amendments filed 7/20/09, with respect to claims 2-4 and 6-8 have been fully considered and are persuasive. The objections of claims 2-4 and 6-8 have been withdrawn.

Response to Arguments- 35 USC § 103

2. Applicant's arguments with respect to claims 1, 5, 9 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

3. Claims 2-4, 6-8, and 11-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Krishnamurthy, Bronskill, and Kuragano all teach a computer aided design system which computes a principal curvature of mesh. However, these references and the remaining prior art of record in combination with the remaining elements and features of the claimed invention, fails

to disclose or suggest "features of said curved surface, said five feature quantities comprising a Gaussian curvature and a mean curvature computed based on said principal curvature, said principal direction, said line of curvature, and said coefficients of the first fundamental form and said coefficients of the second fundamental form" (claims 2, 6). Nor do they teach "wherein, in a case where a mesh point of the mesh is represented by S(u, v), the coefficients of the first fundamental form at the mesh point represented by S(u, v) are E, F and G, such that the coefficients E, F and G are represented by the followings equations:

$E = Su^2$;

F = Su x Sv; and

$G = Sv^2$, and

wherein Su = ∂s/∂u and Sv = ∂s/∂v" (claims 11, 13, 15, 17).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 5, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,256,038 ("Krishnamurthy") in view of US 6,201,549 ("Bronskill"), in view of JP 62135965 ("Kuragano").

7. Krishnamurthy teaches a computer aided design system for designing curved surfaces. However, Krishnamurthy does not teach defining tangent and normal vectors to the curved mesh surface.

8. Bronskill does teach these limitations *(see Figure 8)*.

9. Krishnamurthy and Bronskill are analogous art because they are both related to the field of CAD design.

10. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the tangent and normal vectors of Bronskill with the CAD system for curved surfaces of Krishnamurthy, motivated by the desire to produce "highly realistic...images" *(Bronskill: column 9, lines 60-67)*.

11. Krishnamurthy and Bronskill teach a computer aided design system, but do not teach a second-order differential value of the mesh point

12. Moreton does teach this *(see column 12, lines 7-34; column 14, lines 14-21; column 18, lines 5-30)*.

13. Krishnamurthy, Bronskill and Moreton are all analogous at as they are related to the field of CAD design.

14. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the second-order differential value of Moreton with the CAD system of Krishnamurthy and Bronskill, motivated by the desire to "designing curves, networks of curves, and curved surfaces for use by a computer to perform an analysis or to subsequently display or to toll a curved object *(see Moreton, column 1, lines 6-11)*.

15. Regarding claims 1, 5, 9 and 10, Krishnamurthy, Bronskill and Moreton teach:

A computer aided design system *(Krishnamurthy: column 2, lines 28-44)* comprising:

a point sequence information extraction device which extracts a plurality of point sequences on a curved surface *(Krishnamurthy: column 6, lines 39-59 "approximation mesh points"; column 8, lines 6-34, "face-point curve)*;

a dividing device which generates a curved surface from the point sequences using another computer aided design system, and divides the curved surface into a mesh having a predetermined number of mesh points *(Krishnamurthy: column 8, lines 6-34, "polygon mesh", "face-point curve")*;

a first fundamental form computing device for computing coefficients of a first fundamental form at a mesh point of the mesh, the coefficients of the first fundamental form being defined at the mesh point by a first order differential values of the mesh point *(Bronskill: Figure 8, column 6, lines 10-24, "tangent vector", "normal vector")*;

a second fundamental form computing device for computing coefficients of a second fundamental form at the mesh point, the coefficients of the second fundamental form being defined at the mesh point by a product of a second-order differential values of the mesh point and a normal vector of the mesh at the mesh point *(Moreton: column 12, lines 7-34; column 14, lines 14-21; column 18, lines 5-30)*; and

a memory device which stores the point sequence information, the coefficients of the first fundamental form and the coefficients of the second fundamental form *(Krishnamurthy: column 2, lines 28-44, "computer implemented method")*.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NITHYA JANAKIRAMAN whose telephone number is (571)270-1003. The examiner can normally be reached on Monday-Thursday, 8:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571)272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nithya Janakiraman/
Examiner, Art Unit 2123

/Paul L Rodriguez/
Supervisory Patent Examiner,
Art Unit 2123